REMARKS

Pursuant to the present amendment, claim 19 ahs been amended. Claims 1, 2, 4-19, 21-23, 26-27, 29-36, 39-43 and 45 are pending in the present application. Reconsideration of the present application is respectfully requested in view of the arguments set forth herein.

I. The § 112 Rejection

In the Office Action, claims 1, 2, 4-19, 21-23, 26, 27, 29-36, 39-43 and 45 were rejected under 35 U.S.C. § 112, first paragraph, as allegedly failing to comply with the written description requirement. More specifically, the Examiner alleges that the claim language "wherein said layer of material has an initial thickness above said semiconductor structure" is not supported by the specification. Office Action, pp. 2-3. Applicants respectfully disagree. This aspect of the invention is disclosed throughout the specification and drawings.

By way of background, the invention defined by independent claims 1 and 19 is generally directed to forming a layer of material during a **first time interval**, and reducing the thickness of the layer of material during a **second time interval**. Claim 19 specifically calls for an electroplating process to deposit the layer of material, and an electropolishing process to reduce the thickness of the layer of material. In forming or depositing the layer of material during the first time interval, a plurality of positive and negative pulses are applied. See, Figure 3 (time period t_0-t_1) and associated discussion on p. 14, l. 6 – p. 15, l. 17. After the forming or deposition process is performed, the removal or electropolishing process is performed during the second time interval. See, Figure 3 (time interval t_2-t_3); p. 15, l. 19 – p. 16. l. 34. The removal process comprises a plurality of negative pulses.

Figure 4 depicts the results of the process depicted in Figure 3. More specifically, the electroplating or formation process performed during the first time interval results in the formation of the metal layer 407. The dashed line 409 shows the extension or thickness of the layer 407 after this formation process is performed. Specification, p. 16, ll. 19-19.

After the deposition process is performed to form the layer 407, the electropolishing or removal process is performed during the second time interval to remove a portion of the metal layer 407, as shown in Figure 4. Specification, p. 16, l. 21 – p. 17, l. 10. This removal process reduces the thickness of the layer 407 as depicted in Figure 4 and specifically discussed at p. 17, ll. 4-10.

Thus, it is respectfully submitted that the language identified by the Examiner is fully supported and expressly disclosed in the application as originally filed. Withdrawal of the § 112 rejection is respectfully requested.

II. The Prior Art Rejections

In the Office Action, claims 1, 2, 4-9, 14-15, 18, 19, 21-23, 26, 27, 29, 30, 35, 36, 39, 40, 43 and 45 were rejected under 35 U.S.C. § 102 as allegedly being anticipated by Taylor '144 (U.S. Patent No. 6,750,144). Claims 1, 2, 4-9 and 14-15 were rejected under 35 U.S.C. § 103 as allegedly being unpatentable over Taylor '144. Claims 10-13 and 31-34 were rejected under 35 U.S.C. § 103 as allegedly being unpatentable over Taylor '144 in view of Piersol (U.S. Patent No. 1,785,389). Claims 16-17 and 41-42 were rejected under 35 U.S.C. § 103 as allegedly being unpatentable over Taylor '144 in view of Taylor '528 (U.S. Patent No. 6,309,528). Applicants respectfully traverse the Examiner's rejections.

As the Examiner well knows, an anticipating reference by definition must disclose every limitation of the rejected claim in the same relationship to one another as set forth in the claim. *In re Bond*, 15 U.S.P.Q.2d 1566, 1567 (Fed. Cir. 1990). To the extent the Examiner relies on principles of inherency in making the anticipation rejections in the Office Action, inherency requires that the asserted proposition necessarily flow from the disclosure. *In re Oelrich*, 212 U.S.P.Q. 323, 326 (C.C.P.A. 1981); *Ex parte Levy*, 17 U.S.P.Q.2d 1461, 1463-64 (Bd. Pat. App. & Int. 1990); *Ex parte Skinner*, 2 U.S.P.Q.2d 1788, 1789 (Bd. Pat. App. & Int. 1987); *In re King*, 231 U.S.P.Q. 136, 138 (Fed. Cir. 1986). It is not enough that a reference could have, should have, or would have been used as the claimed invention. "The mere fact that a certain thing may result from a given set of circumstances is not sufficient." *Oelrich*, at 326, quoting *Hansgirg v. Kemmer*, 40 U.S.P.Q. 665, 667 (C.C.P.A. 1939); *In re Rijckaert*, 28 U.S.P.Q.2d 1955, 1957 (Fed. Cir. 1993), quoting *Oelrich*, at 326; see also *Skinner*, at 1789. "Inherency ... may not be established by probabilities or possibilities. The mere fact that a certain thing may result from a given set of circumstances is not sufficient." *Skinner*, at 1789, citing *Oelrich*. Where anticipation is found through inherency, the Office's burden of establishing prima facie anticipation includes the burden of providing "...some evidence or scientific reasoning to establish the reasonableness of the examiner's belief that the functional limitation is an inherent characteristic of the prior art." *Skinner* at 1789.

Moreover, to establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim

limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure. *In re Vaeck*, 947 F.2d 488, 20 U.S.P.Q.2d 1438 (Fed. Cir. 1991); M.P.E.P. § 2142. Moreover, all the claim limitations must be taught or suggested by the prior art. *In re Royka*, 490 F.2d 981, 180 U.S.P.Q. 580 (CCPA 1974). If an independent claim is nonobvious under 35 U.S.C. § 103, then any claim depending therefrom is nonobvious. *In re Fine*, 837 F.2d 1071, 5 U.S.P.Q.2d 1596 (Fed. Cir. 1988); M.P.E.P. § 2143.03.

With respect to alleged obviousness, there must be something in the prior art as a whole to suggest the desirability, and thus the obviousness, of making the combination. *Panduit Corp. v. Dennison Mfg. Co.*, 810 F.2d 1561 (Fed. Cir. 1986). In fact, the absence of a suggestion to combine is dispositive in an obviousness determination. *Gambro Lundia AB v. Baxter Health-care Corp.*, 110 F.3d 1573 (Fed. Cir. 1997). The mere fact that the prior art can be combined or modified does not make the resultant combination obvious unless the prior art also suggests the desirability of the combination. *In re Mills*, 916 F.2d 680, 16 U.S.P.Q.2d 1430 (Fed. Cir. 1990); M.P.E.P. § 2143.01. The consistent criterion for determining obviousness is whether the prior art would have suggested to one of ordinary skill in the art that the process should be carried out and would have a reasonable likelihood of success, viewed in the light of the prior art. Both the suggestion and the expectation of success must be founded in the prior art, not in the Applicant's disclosure. *In re Vaeck*, 947 F.2d 488, 20 U.S.P.Q.2d 1438 (Fed. Cir. 1991; *In re O'Farrell*, 853 F.2d 894 (Fed. Cir. 1988); M.P.E.P. § 2142.

It is respectfully submitted that the inventions defined by the pending claims are allowable over the art of record. As indicated above, the pending claims recite the formation of a layer of material during the first time interval, and reducing the thickness of the layer of material

during a second time interval. All of the pending claims require that the formation or deposition process performed during the first time interval overfill the plurality of openings that have different lateral widths.

With this understanding of Applicants' invention, it is respectfully submitted that Taylor '144 is very far afield from the present invention. Taylor '144 purports to describe a process for filling features of different sizes. Col. 1, ll. 44-54. Taylor '144 notes that the smaller features are typically filled first and the larger features are filled in one or more subsequent steps. Col. 1, ll. 49-51.

Claim 1 recites the steps of, among other things, applying in a first time interval a first current flowing from the electrode through the electrolyte to the semiconductor structure, the first current having a first amperage comprising a plurality of first positive pulses, each of which are applied for a first time duration, and a plurality of first negative pulses, wherein each of the plurality of first negative pulses are applied for a second time duration that **is less than** the first time duration. Claim 1 also involves applying in a second time interval a second current having a second amperage comprising a plurality of second negative pulses, each of the plurality of second negative pulses having an absolute value that is greater than the absolute value of the plurality of first negative pulses. Claim 19 has similar limitations.

At no point does the art of record disclose or suggest the claimed invention as recited in pending independent claims 1 and 19. Among other things, claims 1 and 19 recite that the duration (second time duration) of the negative pulses during the first time interval is less than the duration (first time duration) of the positive pulses during the first time interval. This is **directly contrary** to the teachings of Taylor '144 (Col. 4, ll. 44-49; Figure 1) and Taylor '384

(Col. 7, ll. 26-37; Col. 8, l. 59 – Col. 9, l. 4; Figure 1), wherein the negative pulses are applied for a greater duration than the positive pulses, *e.g.*, note the respective pulse widths.

Moreover, it is respectfully submitted that the process described in Taylor '144 is different from that set forth in the pending claims. Taylor '144 describes a very unique process flow that involves three discrete steps to overfill the plurality of openings shown in Figure 1. Neither profile I or II overfill the plurality of openings of differing widths. While the profile III in Taylor '144 does extend above all of the openings, Taylor '144 expressly teaches that the pulse pattern used to form the layer of material to this profile III is not appropriate for filling the smaller openings.

Moreover, there is no suggestion to modify the teachings of Taylor '144 or Taylor '384 so as to arrive at Applicants' invention. In fact, the methodology disclosed in these references appears to teach opposite to the claimed invention set forth in the pending claims. A recent Federal Circuit case makes it crystal clear that, in an obviousness situation, the prior art must disclose each and every element of the claimed invention, and that any motivation to combine or modify the prior art must be based upon a suggestion in the prior art. *In re Lee*, 61 U.S.P.Q.2d 143 (Fed. Cir. 2002). Conclusory statements regarding common knowledge and common sense are insufficient to support a finding of obviousness. *Id.* at 1434-35. It is respectfully submitted that any attempt to assert that the invention defined by the pending claims is obvious in view of the prior art of record constitutes an impermissible use of hindsight using Applicants' disclosure as a roadmap.

For at least the aforementioned reasons, it is respectfully submitted that all pending claims are in condition for immediate allowance. The Examiner is invited to contact the under-

signed attorney at (713) 934-4055 with any questions, comments or suggestions relating to the referenced patent application.

Respectfully submitted,

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